BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/064,273	06/27/2002	Ji-Cheng Zhao	125503	2691

3

6147 7590 05/02/2003

GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH CENTER
PATENT DOCKET RM. 4A59
PO BOX 8, BLDG. K-1 ROSS
NISKAYUNA, NY 12309

EXAMINER	
LAVILLA, MICHAEL E	
ART UNIT	PAPER NUMBER
1775	

DATE MAILED: 05/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
10/064,273	ZHAO ET AL.
Examiner	**Art Unit**
LA VILLA	1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *three* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____.

2a) ☐ This action is **FINAL.** 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-62* is/are pending in the application.

4a) Of the above, claim(s) *33-62* is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-32* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *Jun 27, 2002* is/are a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). *2*
4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-32, drawn to a nickel aluminide coated substrate, classified in class 428, subclass 615.

II. Claims 33-62, drawn to a method of making a nickel aluminide coated substrate, classified in class 427, subclass 372.2+.

2. The inventions are distinct, each from the other because of the following reasons:

3. Inventions of Group I and of Group II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product can be made by a physical vapor deposition process that entails providing for a gradient in aluminum concentration as claimed by varying the composition of the material to be deposited.

4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

5. Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

6. During a telephone conversation with Mr. DiConza on 21 April 2003 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-32. Affirmation of this election must be made by applicant in replying to this Office action. Claims 33-62 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

7. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

9. **The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.**

10. Claims 3-6, 9, 21-24, and 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

    I. Regarding Claims 3-6 and 21-24, it is unclear how these claims further limit their respective preceding claims. Thus, for example, with respect

to Claim 3, it is unclear whether Claim 3 demands the presence of Cr of a finite amount up to 15 atomic percent in the coating described by Claim 2 or whether Claim 3 demands that, were Cr present in the coating according to Claim 2, it is to be present in a finite amount up to 15 atomic percent. Analogous indefiniteness applies to the other cited claims.

II. Regarding Claims 9 and 27, it is unclear whether these claims call for up to 0.1 atomic percent of carbon and boron, individually or jointly. Do the claims allow for 0.1 atomic percent of boron and 0.1 atomic percent of carbon or do the claims allow for 0.1 atomic percent of boron and carbon together?

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

12. A person shall be entitled to a patent unless –

13. (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

14. (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claims 1, 2, 5, 6, 10-17, 19, 20, 23, 24, and 28-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Darolia USP 6,255,001. Darolia teaches a

50 micron thick beta phase NiAl bondcoat comprising less than 1 atomic percent zirconium that is formed on a nickel superalloy. In order to have beta phase the amount of aluminum must exceed the claimed 30 atomic percent. [See Rigney et al. USP 6,153,313, col. 3, lines 35-37 (teaching that nickel aluminides having predominantly beta phase must possess between 30 and 60 atomic percent of aluminum)]. The presence of a diffusion layer indicates that the initially uniformly homogeneous NiAl bondcoat must contain a concentration gradient having a relatively depleted aluminum concentration level at the interface with the substrate. See Darolia (Abstract; col. 4, lines 14-34; col. 5, lines 21-59; and Claims). B2 crystal phase would be expected to be encompassed by beta phase description of Darolia. See Nazmy USP 6,471,791, col. 1, lines 45-51 (explaining that beta phase encompasses B2 crystal structure).

16. Claims 1-8, 10-26, and 28-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Rigney et al. USP 6,153,313. Rigney teaches coating a superalloy substrate with a nickel aluminide coating having predominantly beta phase, which by inherency requires aluminum content in excess of 30 atomic percent. It would be expected that, in forming these coatings and using these articles, there would be diffusion of aluminum from the nickel aluminide coating into the substrate, resulting in a concentration gradient as claimed. See, for example, Spitsberg et al. USP 6,306,524, Examples 1-4 (demonstrating that diffusion from the coating into the substrate is prevented with a diffusion barrier layer). Such barriers are not present in Rigney. See Rigney (col. 2, lines 12-34; col. 3, line 10

through col. 11, line 19; col. 5, line 54 through col. 6, line 44; col. 8, line 61 through col. 9, line 6; and Tables II-IV). Rigney teaches the claimed additives and coating layer thickness. B2 crystal phase is encompassed by beta phase description of Rigney. See Nazmy USP 6,471,791, col. 1, lines 45-51 (explaining that beta phase encompasses B2 crystal structure).

17. Claims 1, 10, 11, 19, 28, and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Peterman et al USP 5,660,886. Peterman teaches coating a titanium metal substrate with a nickel aluminide layer having a concentration gradient in aluminum, wherein the amount of aluminum is higher at distances farthest from the substrate and wherein the amount is greater than 30 atomic percent. Figure 1 shows two coatings between about 11 and 20 microns wherein the relative amounts of aluminum to nickel is roughly equal, but having the described gradient in concentration. See Peterman (Figure 1; col. 2, lines 32-50; col. 4, line 14 through col. 5, line 67; and Claims).

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

19. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

    1. Determining the scope and contents of the prior art.
    2. Ascertaining the differences between the prior art and the claims at issue.
    3. Resolving the level of ordinary skill in the pertinent art.
    4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

20. Claims 10-12 and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rigney et al. USP 6,153,313. Rigney teaches coating a superalloy substrate with a nickel aluminide coating having predominantly beta phase, which by inherency requires aluminum content in excess of 30 atomic percent. It would be expected that, in forming these coatings and using these articles, there would be diffusion of aluminum from the nickel aluminide coating into the substrate, resulting in a concentration gradient as claimed. See, for example, Spitsberg et al. USP 6,306,524, Examples 1-4 (demonstrating that diffusion from the coating into the substrate is prevented with a diffusion barrier layer). Such barriers are not present in Rigney. See Rigney (col. 2, lines 12-34; col. 3, line 10 through col. 11, line 19; col. 5, line 54 through col. 6, line 44; col. 8, line 61 through col. 9, line 6; and Tables II-IV). Rigney teaches the claimed additives and coating layer thickness. B2 crystal phase is encompassed by beta phase description of Rigney. See Nazmy USP 6,471,791, col. 1, lines 45-51 (explaining that beta phase encompasses B2 crystal structure). Rigney may not exemplify coating layers of the claimed thickness of these claims, but does teach

that coating layers of these claimed thicknesses may be used. It would have been obvious to one of ordinary skill in the art at the time of the invention to apply coating layers of these thicknesses since Rigney teaches that coating layers with these thicknesses are effective.

Allowable Subject Matter

21. Neither the reviewed prior art not the prior art of record appears to teach or render obvious the claimed subject matter of Claims 9 and 27, where in the claimed NiAl layer is to further comprise a finite and small amount of carbon and/or boron. An indefiniteness rejection pertains to these claims, however.

CONCLUSION

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael La Villa whose telephone number is (703) 308-4428. The examiner can normally be reached on Monday through Friday.

23. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (703) 308-3822. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

24. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Michael La Villa
April 29, 2003